2014-1139, -1142, -1144

United States Court of Appeals for the Federal Circuit

ARIOSA DIAGNOSTICS, INC., NATERA, INC. and VERINATA HEALTH, INC.,
Plaintiffs-Appellees,

and

DNA DIAGNOSTICS CENTER, INC.,
Counterclaim Defendant-Appellee,

and

THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY,
Plaintiff,

v.

SEQUENOM, INC. AND SEQUENOM CENTER FOR MOLECULAR MEDICINE, LLC,
Defendants-Appellants,

and

ISIS INNOVATION LIMITED,
Defendant.

Appeals from the United States District Court for the Northern District of California in Nos. 3:11-cv-06391-SI, 3:12-cv-00132-SI, and 3:12-cv-00865-SI, Judge Susan Y. Illston.

BRIEF FOR AMICUS CURIAE INVITAE CORPORATION IN SUPPORT OF APPELLEES AND IN FAVOR OF AFFIRMANCE

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May 12, 2014

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Ariosa Diagnostics, Inc. v. Sequenom, Inc.
Nos. 2014-1139, -1142, -1144

CERTIFICATE OF INTEREST

Counsel for *Amicus Curiae* Invitae Corporation certifies the following:

1. The full name of the *Amicus* represented by us is:

   Invitae Corporation ("Invitae").

2. The name of the real party in interest associated with the *Amicus*:

   Not applicable.

3. All parent corporations and any publicly held companies that own 10% or more of the stock of the parties represented by me:

   Genomic Health, Inc., a publicly traded company, owns more than 10% of Invitae's stock.

4. The names of all law firms and partners or associates that appeared for the parties represented by me in the trial court or are expected to appear in this Court are:

   Richard L. Blaylock, Kirke M. Hasson and Colin T. Kemp of Pillsbury Winthrop Shaw Pittman LLP.

Dated: May 12, 2014

/s/ Richard L. Blaylock
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I. STATEMENT OF INTEREST OF *AMICUS CURIAE*.

Invitae Corporation ("Invitae") is a San Francisco, California-based genetic information company providing genetic testing and genome management services based on human DNA sequencing. Invitae's goal is to bring genetic information into routine medical practice to improve the quality of healthcare for patients worldwide. Invitae is one of many companies in a rapidly evolving industry utilizing advances in massively parallel DNA sequencing to analyze large numbers of genes, as well as to sequence whole genomes or large regions of the genome for diagnostic purposes. *See, e.g.*, *Tracy Tucker et al., Massively Parallel Sequencing: The Next Big Thing in Genetic Medicine*, 85 Am. J. Hum. Genet. 142, 142 and 148-152 (2009), available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2725244/. The future and promise of personalized medicine rests on the ability of medical practitioners to access comprehensive information about patients' genetic information, including whether a patient possesses clinically relevant variations in any of a broad panel of human genes. *Id.*

Invitae is concerned that the arguments advanced by Appellants Sequenom, Inc. and Sequenom Center for Molecular Medicine, LLC ("Appellants"), and by the Biotechnology Industry Organization (appearing as *amicus curiae* in favor of reversal, "Amicus BIO"), are inconsistent with Supreme Court precedent with respect to the law of patent eligibility of applications of natural phenomena. If this

Court were to adopt the radical narrowing of the Supreme Court's holding in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289 (2012), urged by Appellants and Amicus BIO, it would commit error and sow confusion in the genomic testing industry. Such a development would retard the progress of access to patient genetic information for improved patient care. In addition, contrary to Amicus BIO's predictions, such a course would harm—not foster—innovation and technological progress in the genetic diagnostics industry.

Invitae has no direct interest in the result of this case. Furthermore, pursuant to Federal Circuit Rule ("Rule") 29(c)(5), Invitae confirms that (A) no counsel for any party authored this brief in whole or in part; (B) no party or counsel for a party contributed money to fund preparing or submitting this brief; and (C) no person other than Invitae has made any monetary contribution to the preparation or submission of this brief. This brief is solely the work of Invitae and its counsel.

II. CONSENT TO THE FILING OF THIS *AMICUS* BRIEF.

Pursuant to Rule 29(a), Invitae respectfully informs the Court it is submitting this *amicus* brief based on the consent it received from all appellants and appellees to the filing of the same.

III. SUMMARY OF ARGUMENT.

The Supreme Court in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289 (2012) ("*Mayo*"), articulated a framework for evaluating the patent eligibility of claims focused on applications of natural phenomena such as the diagnostic relevance of the presence or absence of a particular DNA sequence in a patient sample. The *Mayo* Court held that to be patent eligible, such claims must contain "other elements or a combination of elements, sometimes referred to as an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself." *Id.* at 1294. Where those added elements are merely "well-understood, routine, conventional activity," such claims are patent ineligible. *Id.* The District Court properly applied this framework to find patent ineligible Appellants' claims which combined an admittedly patent ineligible natural phenomenon with the undisputedly conventional steps of separating the cell free-fraction of maternal blood, amplifying DNA, and conducting nucleic acid analysis of DNA. The *Mayo* framework requires affirmance.

Appellants attempt to avoid *Mayo* by urging this Court to graft a non-existent exception onto the *Mayo* patent eligibility standard. Specifically, Appellants, joined by Amicus BIO, argue that a claim combining a patent ineligible natural phenomenon, such as the diagnostic relevance of paternally

inherited cffDNA, with purely conventional and broadly pre-emptive steps is nonetheless patent eligible so long as the conventional steps had not previously been used with that very natural law. Such a result would conflict with the clear holding of *Mayo* and subvert its rationale of disallowing patent claims which amount to little more than adding the words "apply it" to a newly discovered natural law.

Amicus BIO attempts to support this erroneous narrowing of the *Mayo* framework by raising alarmist concerns about the effect of *Mayo* on innovations in the genetic diagnostics industry. But Amicus BIO sounds an alarm when there is no emergency. Especially in view of the rapidly falling cost of genetic sequencing and exploding availability of patient genomic information, innovation—in the form of the discovery and exploitation of new insights regarding the interpretation of genomic information—does not require the extraordinary incentive of broadly pre-emptive patent coverage. Indeed, patent claims on conventional means of applying newly discovered natural phenomenon (as sought by Appellants and urged by Amicus BIO) would more likely impede the development, dissemination and clinical exploitation of new genomics discoveries. While policy considerations should have no role in the consideration of this appeal, they do not support reversal in conflict with the *Mayo* framework.

IV. ARGUMENT.

A. The District Court Properly Applied the Controlling *Mayo* Standard for Patent Eligibility, and its Ruling Should be Affirmed.

In *Mayo*, the Supreme Court confirmed that natural laws and natural phenomena are not patent eligible and constitute exceptions to the scope of patent eligible subject matter set forth in Section 101.[1] Moreover, the *Mayo* Court noted that unpatentable natural laws and phenomena include those that are narrow in scope, such as the relationship between a detectable biomarker in a biological sample and its diagnostic or therapeutic relevance. *See Mayo*, 132 S. Ct. at 1302; *see also id.* at 1296 ("Prometheus' patents set forth laws of nature—namely, relationships between concentration of certain metabolites in the blood and the likelihood that a dosage of a thiopurine drug will prove ineffective or cause harm.") While the *Mayo* Court allowed that some applications of natural laws are patent eligible, it held that others clearly are not, and articulated a framework for distinguishing between these two categories. *See generally id.* at 1293-98.

1. Sequenom's Combination of Conventional Steps with a Newly Discovered Natural Phenomenon Fails to Transform the Unpatentable Phenomenon into a Patent Eligible Application of it.

The *Mayo* framework requires a court to determine whether a process claim "that focuses upon the use of a natural law also contain[s] other elements or a

[1] References to a "Section" are to those in the Patent Act (35 U.S.C. § 1 *et seq.*).

combination of elements, sometimes referred to as an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself." *Mayo*, 132 S. Ct. at 1294. The *Mayo* Court went on to explain that where the steps of the process— apart from the natural law itself—"involve well-understood, routine, conventional activity" which do not add anything significant to the natural law, such claims are patent ineligible. *See id*. at 1294. Put differently, "simply appending conventional steps, specified at a high degree of generality, to the laws of nature, natural phenomena, and abstract ideas cannot make those laws, phenomena and ideas patentable." *Id*. at 1300.[2]

The District Court correctly applied the foregoing *Mayo* framework to the claims of the '540 patent at issue and properly held them patent ineligible under Section 101.[3] *See Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, Case No. C 11-06391-SI, 2013 WL 5863022 (N.D. Cal. Oct. 30, 2013) (the "Order"). The court

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[2] Appellants largely attempt to divert this Court's attention from the controlling *Mayo* standard by arguing, contrary to well-established Supreme Court jurisprudence on patent eligibility, that any claim to an application of an unpatentable natural law is patent eligible so long as it does not completely pre-empt all possible applications of that natural law. *See* Consolidated Opening Brief of Appellant Sequenom, Inc., dated January 21, 2014 ("Appellant Brief"), at 25-42. As Appellees demonstrate, Appellants are clearly wrong. *See* Consolidated Responsive Brief of Appellees, dated May 5, 2014, at 43-53. Invitae does not supplement Appellees' dismantling of Appellants' arguments on that point here.

[3] The "'540 patent" is shorthand for the patent at issue here, U.S. Patent No. 6,258,540.

first noted the parties agreed that paternally inherited cffDNA[4] in maternal blood is a natural phenomenon. *See id.* at 12:14-15. Then, after noting the '540 patent claimed methods of detecting paternally inherited cffDNA in maternal plasma or serum, the court turned to the fundamental inquiry under *Mayo*: "whether the steps of the claimed methods in the '540 patent, applied to that natural phenomenon, are sufficient to render the claims patentable." Order at 12:22-24.

The steps the '540 patent tacked onto the admitted natural phenomenon were well understood, routine, conventional steps, such as (i) separating plasma or serum from blood, (ii) amplifying DNA, and (iii) detecting DNA, to the natural phenomenon. *See id.* at 13:14-15:7; 13:22-25 (the patent specification and prosecution history and Appellants' expert all stated that amplification and detection of DNA sequences in plasma or serum was well known by 1997). The District Court correctly held this combination of such undisputedly conventional steps with the natural phenomenon of paternally inherited cffDNA cannot render these claims patent eligible. *See id.* at 15:3-7.

[4] "cffDNA" is shorthand for cell-free fetal DNA. By virtue of such DNA being in the cell-free component of maternal blood, it can be found in maternal plasma or serum.

2. The *Mayo* Framework for Assessing Section 101 Patent Eligibility Does Not Turn on the Purported Novelty of an Application of a Natural Phenomenon.

Appellants, joined by Amicus BIO, attempt to avoid *Mayo*'s holding by essentially arguing the '540 patent falls within an exception to *Mayo* which the *Mayo* Court did not create, recognize or otherwise suggest. This Court cannot and should not create it here.

Specifically, Appellants assert that even if the claimed steps were conventional, the inventors of the '540 patent were the first to apply those steps to cffDNA. *See* Appellant Brief at 49 (stating that, "before the '540 patent, *no one* was using the plasma or serum of pregnant mothers to amplify and detect paternally-inherited cffDNA" (emphasis in original)). But their attempt is unavailing. The *Mayo* Court, in its extensive discussion of the limits on the patent eligibility of applications of newly discovered natural laws, never articulates such an exception to the proposition that combining well-understood, routine and conventional steps with a natural law amounts to little more than an effort to patent the natural law itself.

As noted above, the *Mayo* Court clearly states that even newly discovered natural laws and natural phenomena are patent ineligible. Then by stating that some applications of such a newly discovered natural law are patent ineligible, the *Mayo* Court simply cannot be premising its analysis of combinations of such new

natural law with "conventional steps" upon the nonsensical question of whether that very newly discovered natural law had been practiced before its discovery. *See Mayo*, 132 S. Ct. at 1293-1294. Rather, with respect to applications of such patent ineligible laws of nature, the *Mayo* Court noted that its precedent precluded claims which "too broadly pre-empt the use of the natural law," or that fail to contain "an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself," or that limit its use "to a particular technological environment," or add "insignificant post-solution activity." *Mayo*, 132 S. Ct. at 1294. None of these formulations turn on the prior use of these added elements in the context of the newly discovered natural law. Moreover, such a view would reduce the patent eligibility inquiry under Section 101 to a prior art analysis under Sections 102 and 103, contrary to the Mayo Court's express rejection of such an approach as improper. *See id.* at 1303-04.

As with many other genetic tests, the natural law in question is the diagnostic relevance of a particular bit of DNA in a biological analyte. That it concerns paternally inherited DNA merely indicates the sequences of interest; that it concerns cffDNA in maternal blood merely identifies the analyte of interest as the cell-free fraction of maternal blood, *e.g.*, maternal plasma or serum. A person of skill in the art, faced with this natural law at the time of its discovery and tasked

with "applying it" would have applied the acknowledged conventional techniques of analysis for the presence or absence of particular DNA sequences in biological analytes: obtaining the analyte of interest, amplifying the DNA and performing nucleic acid analysis. Thus, patent claims, like those at issue here, that simply combine (i) conventional processes used for exploiting natural laws with (ii) a newly discovered natural law, fail to add anything of significance to that natural law and are consequently patent ineligible. *See Mayo*, 132 S. Ct. at 1298 ("Purely 'conventional or obvious' '[pre]-solution activity' is normally not sufficient to transform an unpatentable law of nature into a patent-eligible application of such a law.")

B. The Policy Arguments Amicus BIO Advances Do Not Support a Departure from the Controlling *Mayo* Standard.

Amicus BIO raises policy-driven objections to the District Court's order finding the patent claims at issue to be patent ineligible. Even if well-founded, policy concerns are the province of Congress and cannot support flouting binding Supreme Court precedent. The *Mayo* Court acknowledged that there are divergent views on the effect of patents and the scope of patent subject matter eligibility as it relates to the diagnostic testing industry, but declined to adopt a special rule in favor of the industry. *See Mayo*, 132 S. Ct. at 1305. In any event, Amicus BIO's policy objections do not survive scrutiny, and the relationship between patents and

innovation in connection with genetic testing is more complex than Amicus BIO would have the Court believe.

1. Following *Mayo* Does Not Threaten Innovation in the Genetic Diagnostic Testing Industry.

Amicus BIO prematurely buries the genomic testing industry with its predictions of an end to innovation without the ability to obtain patent claims which cover combinations of conventional steps, specified at a high level of generality, with a patent ineligible natural law. Amicus BIO premises this concern upon the misplaced belief that developments in genetic diagnostic testing can only come with extraordinary investment and that such investment will not be made without broadly pre-emptive patent protection, such as that which Appellants seek here. But Amicus BIO overstates the cost of such progress because the rapidly falling price of genetic sequencing in 21st century innovation is radically transforming the pace and price of new discoveries.

Since the 1990s, when the sequencing of the first full human genome began, the technologies and chemistry available for genetic sequencing have evolved rapidly. The first human genome was sequenced at a cost of $437 million over 13 years.[5] Today, a single laboratory assay using widely available "Next

[5] *E.g.*, U.S. Dept. of Energy Genome Programs, Human Genome Project Information (2004), http://www.ornl.gov/sci/techresources/Human_Genome/project/budget.shtml.

Generation" methods can sequence the genome of an individual patient in a few days at costs of around $5,000 - $10,000.[6] In fact, this year marked the commercial availability of next generation sequencing instruments enabling the determination of a patient's genome for $1,000.[7] Comprehensive genetic information has become both affordable and easily available to clinicians and researchers alike. There is no reason to expect that the costs of genetic sequencing will do anything other than continue to decline.

The accelerating affordability of genetic sequencing technology means that new discoveries of the type of natural phenomenon at issue in this case—the diagnostic relevance of a particular genetic sequence—can be expected to become a common-place occurrence in a world increasingly enriched by abundant genomic patient data. And the ready accessibility and low cost of genetic data indicates that, contrary to Amicus BIO's stated concerns, innovation will not require the extraordinary levels of investment Amicus BIO suggests.[8] Indeed, Amicus BIO's

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[6] *E.g.*, U.S. National Human Genome Research Institute, DNA Sequencing Costs (2014) available at http://www.genome.gov/sequencingcosts/.

[7] Illumina Introduces the HiSeq X™ Ten Sequencing System: Breaks Barriers with World's First $1,000 Genome, Enables 'Factory' Scale Sequencing for Population and Disease Studies (January 14, 2014) available at http://investor.illumina.com/phoenix.zhtml?c=121127&p=irol-newsArticle&ID=1890696&highlight=.

[8] Amicus Bio attempts to argue the criticality of patent coverage for investment to drive innovation by analogizing to the high cost of conducting clinical trials in the course of developing new therapeutics. *See* Brief of Amicus Curiae

analysis seems grounded in the perspective of the late 1990s, the time the patent-in-suit was filed and when the price of sequencing the human genome was over $400 million. But times have changed: Now and in the coming decades with the extraordinary availability of genomic data in both the research and clinical contexts the investment needed to discover or apply such natural laws will be transformatively low and continue to fall. In today's environment, Amicus BIO's doomsday predictions do not hold up; on the contrary, innovation driving the genomic testing industry can be expected to thrive under the *Mayo* standard.

As even the *Mayo* Court itself recognized, patent protection is not universally accepted as conducive to the promotion of innovation. Indeed, the Supreme Court's jurisprudence on the limits of patent eligibility is animated in part by a concern that patents can impede technological progress by pre-empting applications of a natural law in a broad fashion. *See, e.g.*, *Mayo*, 132 S. Ct. at 1298-99, 1304-05 (noting the divergence of opinion about the beneficence of patents covering human genes or applications of natural correlations of diagnostic

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Biotechnology Industry Organization, dated January 28, 2014 ("Amicus BIO Brief"), at 9-10. But such endeavors (*e.g.*, clinical trials) have a cost structure that is incommensurately higher than the cost of current innovation in the genomic testing industry. Moreover, Amicus BIO's reliance upon Myriad Genetics, Inc.'s allegations that it spent large amounts developing and marketing a test appears misplaced. Putting aside the fact Myriad did not invent many of the patents in its BRCA portfolio, those costs were incurred long before the transformative availability of next generation sequencing technology.

significance). This Court need look no further than the open source software movement for an illustration of a vibrant culture of innovation persisting in the absence of patent protection. *See, e.g.*, Georg von Krogh, Open-Source Software Development, MIT Sloan Management Review 44, 14-18 (2003). In open source software, too, the cost of innovation and improvement upon existing available information and technology is not great and is not constrained by the absence of patent protection.

2. Following *Mayo* Will Not Cause Data Suppression.

Amicus BIO asserts that without patent protection broadly pre-empting applications of natural laws correlating multiple genetic factors with propensity for a specific disease, researchers will forego publication and "turn to trade secret protection for the most important (and commercially viable) future discoveries in diagnostics." Amicus BIO Brief at 7. To illustrate its point, it cites a long string of academic journal articles suggesting that multiple identified genetic factors may be relevant to the determination of a patient's propensity for a particular disease. Notably, Amicus BIO offers no evidence that the authors of such publications were motivated by considerations of patent protection to bolster its dour prediction of data suppression.

Moreover, experience does not support Amicus BIO's contention that the type of diagnostic method patents it champions necessarily facilitates open

dissemination of information important to research and clinical practice. For example, Myriad Genetics, Inc. notoriously claims to have a patent position which, in its view, bars others from testing patients for the presence or absence of various known mutations in the BRCA1 and BRCA2 genes. Nonetheless, despite that claimed patent position, Myriad has been widely criticized in the clinical community for its failure since November 2004 to share with public databases variations it has observed in these genes and their diagnostic significance. *See*, *e.g.*, Robert Cook-Deegan et al., The Next Controversy in Genetic Testing: Clinical Data as Trade Secrets, The European Journal of Human Genetics, 21 (2012) 585, 586 available at https://www.eshg.org/fileadmin/eshg/Downloads/EJHG_ Paper_RCD_October_31_2012.pdf. By contrast, many participants in the genomic testing industry who do not claim to hold a patent position with respect to these or other genes have contributed to public databases cataloging known variations in these (and many other) genes and their clinical significance.[9] Consequently, while Amicus Curiae respects the views of Amicus BIO, it respectfully suggests that the

[9] For example, the National Center for Biotechnology Information's "ClinVar" is a "freely accessible, public archive of reports of the relationships among human variations and phenotypes, with supporting evidence." *See*, *e.g.*, National Center for Biotechnology Information, What is ClinVar? (2014) available at http://www.ncbi.nlm.nih.gov/clinvar/intro/. ClinVar only includes curated data and covers over 100,000 variations which relate to over 18,000 human genes. *See, e.g.*, National Center for Biotechnology Information, ClinVar Submissions (2014) available at http://www.ncbi.nlm.nih.gov/clinvar/submitters/.

latter's fear that application of *Mayo* will impair publication of innovative developments in the genomic testing industry are not well-grounded at this point.

3. In Fact, the Misapplication of *Mayo* Appellants Urge Would Threaten Innovation by Broadly Pre-Empting Applications of Natural Laws.

Ironically, the "complete pre-emption" standard Appellants invent would, in fact, burden the industry with a patent thicket of claims seeking to pre-empt broadly applications of newly discovered natural laws and phenomena of diagnostic relevance. Such a thicket would irrevocably fracture amongst multiple claimants to diverse portions of the genome, thereby obstructing the analysis of patient genetic information and dramatically interfering with its clinical exploitation.

This would be particularly problematic for the genetic testing industry. As that industry migrates away from single gene tests to large gene panels and whole genome testing, the proliferation of such improperly granted, broadly pre-emptive patents held by diverse parties would only serve to pre-empt clinicians and companies serving those clinicians from engaging in comprehensive analyses of patient genomic information. The biggest losers would be the patients.

4. Neither the *Mayo* Standard Nor Affirmance Here Effect a "Ban" on Diagnostic Patents.

Finally, Amicus BIO has sounded an alarm but there is no emergency: The *Mayo* standard—as properly applied by the District Court—does not lead to a

"complete ban" on diagnostic patents. Amicus BIO Brief at, *e.g.*, 3. Rather the Supreme Court articulated an exception to Section 101 patent subject matter eligibility: natural phenomena are not patentable; some applications of natural phenomena are patentable, but applications that do nothing more than add "well understood, routine, conventional activity, previously engaged in by those in the field" to a phenomenon are not patent eligible. *Mayo*, 132 S. Ct. at 1293-94. There is no "ban" because claims containing additional elements constituting "an 'inventive concept' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself" may be patent eligible. *Id*. at 1294.

V. CONCLUSION.

For the foregoing reasons, the judgment of the District Court should be affirmed.

Dated: May 12, 2014

Respectfully submitted,

By: */s/ Richard L. Blaylock*

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CERTIFICATE OF SERVICE

I, Robyn Cocho, being duly sworn according to law and being over the age of 18, upon my oath depose and say that:

Counsel Press was retained by PILLSBURY WINTHROP SHAW PITMAN LLP, Attorneys for Amicus Curiae to print this document. I am an employee of Counsel Press.

On **May 12, 2013** counsel has authorized me to electronically file the foregoing **Brief for Amicus Curiae** with the Clerk of Court using the CM/ECF System, which will serve via e-mail notice of such filing to all counsel registered as CM/ECF users, including any of the following:

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Any counsel for Amici Curiae who are registered users, at the time of filing, will also be served via e-mail notice from the Clerk of Court via the CM/ECF System.

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Dated: May 12, 2014

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE, AND TYPE STYLE REQUIREMENTS

1. I hereby certify that this brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(B) because it contains 3,801 words, excluding the parts exempted by Fed. R. App. P. 32(a)(7)(B)(iii).

2. I hereby certify that this brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6) because this brief has been prepared in a proportionally spaced typeface using Microsoft Word 2013, in 14 point Times New Roman.

Dated: May 12, 2014

/s/ Richard L. Blaylock
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